

**2.8 RELATED MATERIALS**

A. Isolation-Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber or ASTM D 1752, cork or self-healing concrete surfaces. Do not use concrete surface sealers.

B. Bonding Agent: ASTM C 1059, Type II, non-rependent, acrylic emulsion or styrene butadiene.

C. Epoxy Bonding Adhesive: ASTM C 881, two-component epoxy resin, capable of hand curing and bonding to damp surfaces, of class suitable for application temperature and of grade suitable for repair.

1. Types I or II, for non-load bearing and Types IV and V, for load bearing, for bonding heavily or freshly wetted concrete to hardened concrete.

**2.9 REPAIR MATERIALS**

A. Repair Underlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thickness from 1/8 inch (3.2 mm) and that can be feathered at edges to match adjacent elevations.

1. Cement Binder: ASTM C 150, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.

2. Primer: Product of underlayment manufacturer recommended for substrate, conditions, and application.

3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch (3.2 to 6 mm) or coarse sand as recommended by underlayment manufacturer.

4. Compressive Strength: Minimum 4000 psi (28 MPa) at 28 days when tested according to ASTM C 1004/1004M.

B. Cement Overlaying: Cement-based, polymer-modified, self-leveling product that can be applied in thickness from 1/8 inch (3.2 mm) and that can be feathered at edges to match adjacent floor elevations.

1. Cement Binder: ASTM C 150, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.

2. Primer: Product of topping manufacturer recommended for substrate, conditions, and application.

3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch (3.2 to 6 mm) or coarse sand as recommended by topping manufacturer.

4. Compressive Strength: Not less than 5000 psi (34.5 Mpa) at 28 days when tested according to ASTM C 1004/1004M.

**2.10 CONCRETE MIXTURES, GENERAL**

A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of field mixtures and laboratory tests.

1. Use a qualified independent testing agency for preparing and reporting proposed mixture designs based on laboratory field mixtures.

2. Obtain test results, including percentages, by weight, of cementitious materials other than portland cement in concrete as follows:

a. Fly Ash: 10 percent.

b. Combined Fly Ash and Pozzolan: 10 percent.

c. Ground Granulated Blast-Furnace Slag: 10 percent.

d. Combined Fly Ash or Pozzolan and Ground Granulated Blast-Furnace Slag: 10 percent per se.

C. Admixtures: Use admixtures according to manufacturer's written instructions.

1. Use water-reducing and/or high-range water-reducing or plasticizing admixture in concrete as required during curing.

2. Use water-reducing and retaining admixture when required by high temperatures, low humidity, or other adverse conditions.

3. Use water-reducing admixture in pumped concrete, concrete required to be watertight, and concrete used for exterior surfaces.

4. Color Pigment: (arch verify if pigment is required.) Add color pigment to concrete mixture according to manufacturer's written instructions and to result in hardened concrete consistent with approved mockups.

**2.11 CONCRETE MIXTURES FOR BUILDING ELEMENTS**

A. Piers: Proportion normal-weight concrete mixtures as follows:

1. Minimum Compressive Strength: 3000 psi (20.7 MPa) at 28 days.

2. Maximum Water-Cementitious Materials Ratio: 0.50.

3. Slump Limit: Before adding high-range water-reducing admixture or plasticizing admixture, 6 to 8 inches (152 mm).

4. Air Content: 5 to 7 percent, plus or minus 1.0 percent of point of delivery for maximum aggregate size.

5. Aggregate: Normal weight; ASTM D448.

6. Coarse Aggregate: Size No. 57 (1 1/4 to No. 4).

B. Footings: Proportion normal-weight concrete mixtures as follows:

1. Minimum Compressive Strength: 3000 psi (20.7 MPa) at 28 days.

2. Maximum Water-Cementitious Materials Ratio: 0.45

3. Slump Limit: 5 inches (125 mm) plus or minus 1 inch (25 mm).

4. Air Content: 5 to 7 percent, plus or minus 1.0 percent of point of delivery for maximum aggregate size.

5. Aggregate: Normal weight; ASTM D448.

6. Coarse Aggregate: Size No. 57 (1 1/4 to No. 4).

**2.12 FABRICATING REINFORCEMENT**

A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

**2.13 CONCRETE MIXING**

A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M and ASTM C 1116, and furnish batch tickets and information 32 deg C (90 deg F) when air temperature is below 50 deg F (10 deg C), reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F (32 deg C), reduce mixing and delivery time to 60 minutes.

**PART 3 - EXECUTION**

**3.1 EMBEDDED ITEMS**

A. Fabricate steel anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, drawings, and specifications for each embedded item.

1. Install anchor rods, anchor bolts, seismic holdowns; accurately located, to elevations required and complying with tolerances in Section 7.5 of AISC's "Code of Standard Practice for Structural Steel Buildings."

**3.2 WAPOR RETARDERS**

A. Plastic Vapor Retarders: Place, protect, and repair vapor retarders according to ASTM E 1744 and manufacturer's written instructions.

1. Lap joints 6 inches. Install the manufacturer's recommended two-sided pressure-sensitive tape, 4" from edge of the bottom sheet. Apply a single-sided, 4" wide adhesive tape to the double top sheet. Use the manufacturer's recommended adhesive penetrations. At pipe penetrations, install vapor barrier material boots which overlap the vapor barrier of minimum 6 inches and extend 1 inch above the top of the pipe and secure the boot with a hose clamp centered on the two-sided tape.

B. Bituminous Vapor Retarders: Place, protect, and repair vapor retarders to comply with manufacturer's written instructions.

**3.3 STEEL REINFORCEMENT**

A. General: Comply with CRSI's "Manual of Standard Practice" for placing reinforcement, and for repair or puncture vapor retarder. Repair damage and reset vapor retarder before placing concrete.

B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials before placing.

C. Accurately position, support, and secure reinforcement against displacement. Locate and secure reinforcement with minimum contact with concrete cover. Do not touch weld crossing reinforcing bars.

D. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.

**3.4 JOINTS**

A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.

B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.

1. Place joints perpendicular to reinforcement. Continue reinforcement across construction joints, unless otherwise indicated. Do not continue reinforcement through or into the placement of concrete.

2. Form keyed joints as required for construction joints. Embed keys at least 1-1/2 inches (38 mm) into concrete.

3. Place vertical construction joints as possible. Locate joints beside piers, near corners, and in concealed locations where possible.

4. Use bonding epoxy to repair fresh concrete is placed adjacent to hardened and/or partially hardened concrete surfaces.

C. Construction Joints in Horizontal Slabs: Form weakened-plane construction joints, sectioning concrete into areas less than 500 sq. ft. Construct construction joints for a depth equal to at least 1/4 of slab thickness.

D. Grooved Joints: Form construction joints after initial finishing by grooving and finishing each edge of joint to a radius of 1/8 inch (3.2 mm). Repeat grooving of construction joints after concrete has cured. Eliminate groover tool marks on concrete surfaces.

E. Sowed Joints: Form construction joints with power saws equipped with shatterproof abrasive or diamond-tipped blades. Cut 1/8-inch (3.2-mm)-wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.

F. Dowelled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or asphalt coat one-half of dowel length to prevent concrete bonding to one side of joint.

**3.5 CONCRETE PLACEMENT**

A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been approved in writing.

B. Before start sampling and placing concrete, water may be added at Project site, subject to limitations of ACI 301.

C. Do not add water to concrete after adding high-range water-reducing admixtures to mixture.

D. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or joints in concrete. If a section of concrete provides concrete placement joints as indicated, Deposit concrete to avoid segregation.

E. Consolidate concrete in horizontal layers that do not exceed formwork design spans and in a manner to avoid inclined construction joints.

F. Consolidate concrete in horizontal layers that do not exceed formwork design spans and in a manner to avoid inclined construction joints.

G. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically in uniform spaced locations to rapidly penetrate placed layer and at least 6 inches (150 mm) above and below each layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time necessary to consolidate concrete and other embedded items and other embedded items and concrete without causing mixture constituents to segregate.

H. Do not use vibrators to transport concrete in a continuous operation, within limits of construction joints, until placement of a section is complete.

I. Consolidate concrete during placement operations so concrete is thoroughly worked and reinforced and other embedded items are fully encased in concrete.

J. Maintain reinforcement in position on chairs during concrete placement.

K. Screen slab surfaces with a straightedge and strike off to correct elevations.

L. Slope surfaces uniformly to drains where required.

M. Finish interior surfaces with a screed to form a uniform and open-textured surface plane, unless before broadcaster operators on the surface. Do not further disturb slab finish until concrete has cured.

N. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete slab from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.

1. When average high and low temperature is expected to fall below 40 deg F (4.4 deg C) for 48 hours, use protective measures to prevent concrete from freezing.

2. Do not use materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.

3. Do not use admixtures containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.

O. Hot-Weather Placement: Comply with ACI 301 and as follows:

1. Maintain concrete temperature below 90 deg F (32 deg C) at time of placement. Chilled mixing water or chilled ice may be used to control temperature, provided the equivalent of ice is using liquid water and the chilled water is the cooling water in the concrete is the Contractor's option.

2. Fog-spray water, steel reinforcement, and subgrade just before placing concrete. Keep aggregate uniformly moist, without standing water, just before or during placement.

**3.6 FINISHING FLOORS AND SLABS**

A. General: Comply with ACI 302.1B recommendations for screeding, restraining, and, if required, floating concrete surfaces. Do not use concrete surface sealers.

B. Scratch Finish: While still plastic, texture concrete surface that has been screeded and bull-floored or dobed. Use stiff brushes, brooms, or rollers to produce a profile amplitude of 1/4 inch (6 mm) in 1 direction.

1. Apply scratch finish to surfaces to receive mortar setting beds for bonded cementitious floor finishes.

C. Float Finish: Consolidate surface with power-driven floats or hand floating if area is too inaccessible to power driven floats. Restrain, float, and resurface until uniform. Do not provide float passes and restraining until surface is left with a uniform, smooth, granular texture.

D. Apply float finish to surfaces to receive trowel finish.

E. Trowel Finish: After applying float finish, apply first troweling and consolidate defects by hand or power-driven trowel. Control troweling passes and restraining until surface is free of trowel marks and uniform in texture and appearance. Grind smooth any surface concrete as defined in ASTM C 1191.

F. Primer: Product of underlayment manufacturer recommended for substrate, conditions, and application.

G. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch (3.2 to 6 mm) or coarse sand as recommended by underlayment manufacturer.

H. Compressive Strength: Minimum 4000 psi (28 MPa) at 28 days when tested according to ASTM C 1004/1004M.

I. Cement Overlaying: Cement-based, polymer-modified, self-leveling product that can be applied in thickness from 1/8 inch (3.2 mm) and that can be feathered at edges to match adjacent floor elevations.

1. Cement Binder: ASTM C 150, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.

2. Primer: Product of topping manufacturer recommended for substrate, conditions, and application.

3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch (3.2 to 6 mm) or coarse sand as recommended by topping manufacturer.

4. Compressive Strength: Not less than 5000 psi (34.5 Mpa) at 28 days when tested according to ASTM C 1004/1004M.

**3.7 MISCELLANEOUS CONCRETE ITEMS**

A. Filling In: Fill in holes and openings left in concrete structures, unless otherwise indicated, after other trades in place. Mix, place, and cure concrete, as specified, to blend with in-place concrete. Provide other miscellaneous concrete filling indicated.

B. Formwork: Provide and erect formwork for concrete placement. Formwork shall be required to complete the work.

C. Formwork: Provide monolithic finish to interior curbs by stripping forms, while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations smooth.

D. Equipment Bases and Foundations: Provide machine and equipment bases and foundations in accordance with drawings and manufacturer's furnished machines and equipment, complying with diagrams or templates from manufacturer furnishing machines and equipment.

**3.8 CONCRETE PROTECTING AND CURING**

A. General: Protect concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 301 for hot-weather protection during curing.

B. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss exceeding 0.2 lb/sq. ft. x 1 (1 kg/sq. m x h) before and during curing operations, according to manufacturer's written instructions after drying, screeding, and bull floating or dobing concrete, but before final finishing.

C. Uniformed Surfaces: Begin curing immediately after finishing concrete on uniformed surfaces, including floors and slabs, concrete floor toppings, and other surfaces.

D. Moisture Control: Keep surfaces continuously moist for not less than seven days with the following methods:

1. Moisture curing: Keep surfaces continuously moist for not less than seven days with the following methods:

a. Water.

b. Continuous water-fog spray.

2. Moisture cure or use moisture-retaining coats to cure concrete surfaces and edges with 12-inch (300-mm) wide open adjacent absorbent covers.

3. Moisture-retaining compound: Apply moisture-retaining compound to concrete surfaces to receive floor coverings with either a moisture-retaining cure or a curing compound that the manufacturer certifies will not interfere with bonding of floor coverings.

4. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recast areas subjected to heavy rainfall must be protected during curing period.

5. Moisture curing compound: Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller according to manufacturer's written instructions. Recast areas subjected to heavy rainfall must be protected during curing period.

6. Curing and Sealing compound: Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller according to manufacturer's written instructions. Recast areas subjected to heavy rainfall must be protected during curing period.

7. Curing compound: Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller according to manufacturer's written instructions. Recast areas subjected to heavy rainfall must be protected during curing period.

8. Curing and Sealing compound: Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller according to manufacturer's written instructions. Recast areas subjected to heavy rainfall must be protected during curing period.

9. Curing compound: Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller according to manufacturer's written instructions. Recast areas subjected to heavy rainfall must be protected during curing period.

10. Curing and Sealing compound: Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller according to manufacturer's written instructions. Recast areas subjected to heavy rainfall must be protected during curing period.

**3.9 FIELD QUALITY CONTROL**

A. Testing and Inspection: The Contractor will engage a special inspector and qualified independent testing agency to perform field tests, inspections, and Special Inspections and prepare test reports.

B. Special Inspections: Obtain all required special inspections.

C. Heeded bolts and studs.

D. Concrete placement, including conveying and depositing.

E. Reinforcing steel placement, including conveying and depositing.

F. Concrete strength, slump, and temperature.

G. Field testing and testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed in accordance with the following requirements:

1. Testing Frequency: Obtain at least one composite sample for each 100 cu yd. (76 cu m) of concrete.

2. Test Results: Test results shall be the average compressive strength from a set of two specimens obtained from same composite sample and tested at age indicated.

3. Compressive strength test shall be the average compressive strength from a set of two specimens obtained from same composite sample and tested at age indicated.

4. Compressive strength test shall be the average compressive strength from a set of three consecutive compressive-strength tests equals or exceeds specified compressive strength or no compressive-strength test value falls below specified compressive strength by more than 10 percent (1.4 MPa).

5. Test results shall be reported in writing to Owner, Architect, Engineer, contractor, manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.

6. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.

7. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, or entrainment, compressive strengths, or other requirements have not been met, as directed by Architect. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cured cylinders complying with ASTM C 42/C 42M or by other methods as directed by Architect.

8. Additional testing and inspecting, at Contractor's expense, will be required to determine compliance of repaired or additional work with specified requirements.

9. Correct deficiencies in the Work that test reports and inspections indicate does not comply with the Contract Documents.

**SECTION 04001 - MASONRY WORK**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

A. Work Includes: Provide all masonry, grout, mortar, related reinforcing, and installation as indicated on the drawings described herein.

**PART 2 - PRODUCTS**

**2.1 BRICK**

A. Acceptable Manufacturers / Product:

1. Acme Brick Co., (817) 332-4101, Color: Ref. Exterior Finish Schedule

2. The Deaver Brick Co., (303) 988-6952, Color: Ref. Exterior Finish Schedule

3. Belden Brick Co., (330) 458-0031, Color: Ref. Exterior Finish Schedule

B. Face Brick: Provide brick as follows:

1. Type: Meet ASTM standards, Grade MW above grade, Grade SW when brick is in contact with earth.

2. King Size: (9-5/8" x 3-3/4" x 3-5/8")

**2.2 CONCRETE MASONRY UNITS**

A. Acceptable manufacturers:

1. Featherite Corporation, (512) 255-2573.

2. Featherite Corporation, (512) 255-2573.

B. Concrete Masonry Units (CMU): Provide as follows:

1. Split-face veneer and smooth face concrete masonry units (cmu), load bearing 8x16 and 8x20 or non-load bearing veneer blocks, 4" nominal thickness, with 8x16" face dimensions, to comply with ASTM C 90. Type I, fabricated using ASTM C 331 split-finish aggregate.

2. Color: Ref. Exterior Finish Schedule

3. Units shall have a minimum compressive strength (m') of 3000 psi at 28 days.

4. Masonry and mortar shall have an integral waterproofing agent as determined by the manufacturer.

**2.3 OTHER MATERIALS**

A. Portland Cement: Comply with ASTM C150, Type I or II, low alkali. "Masonry" cement will not be acceptable.

B. Admixtures and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

**PART 1 - GENERAL**

**1.1 RELATED DOCUMENTS**

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

**1.2 SUMMARY**

A. Section Includes the following:

1. Structural.

2. Architecturally exposed structural steel.

3. Reinforcement:

a. Brace: Comply with ASTM A615, grade 40, unless otherwise shown on the Drawings, using drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

2. Bending: Comply with ACI 318.

3. Development: Comply with ACI 318.

4. Division 5 Section "Painting" for field installation of steel connectors.

5. Division 5 Section "Metal Fabrications" for steel lites not attached to structural-steel frame and other metal items not defined as structural steel.

6. Division 5 Section "High-Performance Coatings" for surface preparation and priming requirements.

7. Division 5 Section "Metal Connectors" for canopy decking and fascia.

**1.3 DEFINITIONS**

A. Structural Steel: Elements of structural-steel frame, as classified by AISC's "Code of Standard Practice for Steel Buildings and Bridges," that support design loads.

B. Steel Decking: Steel Decking for Masonry Reinforcing of America, (800) 848-6722.

C. Preformed Control Joints: Neoprene Material - Provide with corner and tee accessories as indicated.

D. Joint Finishing: Closed cell polyurethane; oversized 50 percent to joint width; self expanding, with 3% inch loss to maximum thickness with maximum lengths.

1. Filling: At wall bottoms and steel angles. Provide one of the following:

a. Fiberglass 200, Du-r-wal, (630) 851-8400.

b. No. 4100, by Masonry Reinforcing of America, (800) 848-6722.

c. No. 4100, by Masonry Reinforcing of America, (800) 848-6722.

d. Fiberglass 200, Du-r-wal, (630) 851-8400.

e. No. 4100, by Masonry Reinforcing of America, (800) 848-6722.

f. Fiberglass 200, Du-r-wal, (630) 851-8400.

2. Weeps: Preformed clear plastic tubes, 3/8" O.D. x 3-1/2" length; 20/cu. ft. at wall bottoms and steel angles. Provide one of the following:

a. DA-1003, by Du-r-wal, (630) 851-8400.

b. Terminals: Provide monolithic finish to interior curbs by stripping forms, while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations smooth.

c. No. 4100, by Masonry Reinforcing of America, (800) 848-6722.

**2.4 MORTAR AND GROUT MIXES**

A. Mortar: And grout used or by governmental agencies having jurisdiction, provide type "N" mortar consisting of:

1. One part Portland Cement to

2. Two part fine sand, by volume.

3. Six parts sand measured damp and loose.

4. Do not use admixtures unless specifically approved in advance and by governmental agencies having jurisdiction.

5. Mix in a mechanically operated mortar mixer for at least three minutes after all ingredients are thoroughly mixed to make thoroughly uniform.

6. On mortar boards, re-temper only by adding water within the batch formed with mortar, and by working the mortar into the water.

B. Grout: Do not use mortar which is used after 1 1/2 hours following the initial mixing.

1. Where compressive strengths exceeding 2000 psi are called for on the Drawings or required by governmental agencies having jurisdiction, provide a laboratory designed mix to the approval.

2. Where compressive strengths are not specified, use a laboratory designed mix to the approval.

**PART 3 - EXECUTION**

**3.1 SURFACE CONDITIONS**

A. Prepare and condition surfaces and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until conditions are corrected.

B. Foundations:

1. Do not commence installation until foundations are clean, rough, and level.

2. Verify that the bed joint thickness will be between 1/2 inch (12.7 mm) and 3/4 inch (19.0 mm).

3. Verify that the foundation elevation is true to the bed joint thickness will be between 1/2 inch (12.7 mm) and 3/4 inch (19.0 mm).

4. Clean projecting dowels free from loose scale, dirt, concrete, and other material that will inhibit bond.

5. Verify that dowels are in proper location.

**3.2 INSTALLATION**

A. Wetting of masonry units.

B. Mortar: Apply mortar sufficiently damp so that mortar will remain plastic enough to permit the masonry unit to be leveled and plumbed immediately after being laid without disturbing the bond.

1. Unless otherwise indicated on the Drawings, make the masonry work plumb, level, and true to the masonry work.

2. Use line blocks wherever possible. When it is absolutely necessary to use a level, pin the level to the masonry work.

3. Use only masonry units that are clean and free from dust and other foreign matter.

4. Do not use bonding headers on grouted masonry unless specifically so directed.

5. Do not use bonding headers on grouted masonry unless specifically so directed.

6. Bad joints:

a. Break all bad joints, sloping toward the center of the wall in such a manner that the bed joints will be filled when the masonry units are finally brought to line.

b. Do not force the bed joints.

c. Avoid fins of bed joints protruding into grout space.

d. Remove caulks or other materials from the bed joint thickness.

e. Do not, in any case, cut off and drop into the grout space.

7. Head joints: Regardless of stone, completely fill with mortar or grout.

8. When masonry units are being moved or shifted, remove and lay again in fresh mortar.

9. Except at the finishing course, stop grout.

10. Test: Testing Agency Qualifications: An independent testing agency, acceptable to authorities having jurisdiction, qualified according to ASTM E 329 to conduct the testing indicated, as follows:

a. Cleaning: Clean and prepare steel surfaces that are to remain unpainted according to SSPC-SP-11, "Solvent Cleaning."

b. Painting: Prepare steel for surface coating after work to structural steel and for passage of other work through steel framing members.

c. Protect slits, ledges, offsets, door jams, corners, and similar points from damage and for each case, provide:

1. Immediately remove mortar and grout from areas where they are not scheduled to be steel surfaces.

2. Base-Patch Holes: Cut, drill, mechanically thermal cut, or punch holes perpendicular to steel surfaces.

**2.5 SHOP CONNECTIONS**

A. Weld Connections: Comply with AWS D1.1 for welding procedure specifications, tolerances, appearance, and quality of welds and for methods used in architectural exposed steel.

B. Assemble and weld both ends of members to be welded, and in alignment with the alignment of axes without exceeding tolerances of AISC's "Code of Standard Practice for Steel Buildings and Bridges" for mill material.

C. Verify that weld sizes, fabrication sequence, and equipment used for architecturally exposed structural steel will limit distortions to allowable tolerances.

D. Grind or fill exposed flat welds to smooth profile. Dress exposed welds.

**PART 3 - EXECUTION**

**3.1 EXAMINATION**

A. Verify elevations of concrete bearing surfaces and locations of anchor rods, bearing plates, and other embedments, and for methods used in architectural exposed steel.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

**3.2 PREPARATION**

A. Provide temporary shores, guys, braces, and other supports during erection to keep structural steel secure, plumb, and in alignment against temporary construction loads and loads equal in intensity to design loads. Remove temporary supports when permanent structural steel connections or bracing are in place, unless otherwise indicated.

**3.3 ERECTION**

A. Set structural steel including in locations and to elevations indicated and according to AISC's "Code of Standard Practice for Steel Buildings and Bridges" and "Specification for Structural Steel Buildings--Allowable Stress Design and Plastic Design."

B. Base Plates: Clean concrete-bearing surfaces of bond-breaking materials, and roughen surfaces prior to setting base plates.

1. Set base plates for structural members on setting nuts as required.

2. Clean concrete-bearing surfaces of bond-breaking materials, and roughen surfaces prior to setting base plates.

3. Snug-tighten anchor rods after supported members have been positioned and plumbed prior to setting base plates.

4. Promptly pack grout solidly between bearing surfaces and base plates so voids remain. Nestly finish exposed surfaces; protect grout and allow to cure. Comply with manufacturer's written installation instructions for shrinkage-resistant grout.

C. Maintain erection tolerances of structural steel and architectural exposed structural steel within AISC's "Code of Standard Practice for Steel Buildings and Bridges."

D. Align and adjust various members forming part of complete frame or structure before permanently fastening. Before assembly, clean bearing surfaces and other surfaces that will be in permanent contact with members. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.

E. Make allowances for difference between temperature at time of erection and mean temperature when structure is completed and in service.

F. Splice members only where indicated.

G. Remove erection bolts on welded, architecturally exposed structural steel; fill holes with plug welds; and grind smooth all exposed surfaces.

H. Do not use thermal cutting during erection.

I. Do not enlarge until holes in members by burning or using drift pins. Ream holes with the following:

1. Product Data: Manufactured masonry and application materials including mortar color charts, and weather resistant barrier.

2. Samples: Panel containing full-size samples of specified manufactured masonry may conduct tests to determine adequacy of concrete by cured cylinders complying with ASTM C 42/C 42M or by other methods as directed by Architect.

3. Units shall have a minimum compressive strength (m') of 3000 psi at 28 days.

4. Masonry and mortar shall have an integral waterproofing agent as determined by the manufacturer.

**SECTION 05120 - STRUCTURAL STEEL**

**PART 1 - GENERAL**

**1.1 RELATED DOCUMENTS**

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

**1.2 SUMMARY**

A. Section Includes the following:

1. Structural.

2. Architecturally exposed structural steel.

3. Reinforcement:

a. Brace: Comply with ASTM A615, grade 40, unless otherwise shown on the Drawings, using drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

2. Bending: Comply with ACI 318.

3. Development: Comply with ACI 318.

4. Division 5 Section "Painting" for field installation of steel connectors.

5. Division 5 Section "Metal Fabrications" for steel lites not attached to structural-steel frame and other metal items not defined as structural steel.

6. Division 5 Section "High-Performance Coatings" for surface preparation and priming requirements.

7. Division 5 Section "Metal Connectors" for canopy decking and fascia.

**1.3 DEFINITIONS**

A. Structural Steel: Elements of structural-steel frame, as classified by AISC's "Code of Standard Practice for Steel Buildings and Bridges," that support design loads.

B. Steel Decking: Steel Decking for Masonry Reinforcing of America, (800) 848-6722.

C. Preformed Control Joints: Neoprene Material - Provide with corner and tee accessories as indicated.

D. Joint Finishing: Closed cell polyurethane; oversized 50 percent to joint width; self expanding, with 3% inch loss to maximum thickness with maximum lengths.

1. Filling: At wall bottoms and steel angles. Provide one of the following:

a. Fiberglass 200, Du-r-wal, (630) 851-8400.

b. No. 4100, by Masonry Reinforcing of America, (800) 848-6722.

c. No. 4100, by Masonry Reinforcing of America, (800) 848-6722.

d. Fiberglass 200, Du-r-wal, (630) 851-8400.

e. No. 4100, by Masonry Reinforcing of America, (800) 848-6722.

f. Fiberglass 200, Du-r-wal, (630) 851-8400.

2. Weeps: Preformed clear plastic tubes, 3/8" O.D. x 3-1/2" length; 20/cu. ft. at wall bottoms and steel angles. Provide one of the following:

a. DA-1003, by Du-r-wal, (630) 851-8400.

b. Terminals: Provide monolithic finish to interior curbs by stripping forms, while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations smooth.

c. No. 4100, by Masonry Reinforcing of America, (800) 848-6722.

**2.4 MORTAR AND GROUT MIXES**

A. Mortar: And grout used or by governmental agencies having jurisdiction, provide type "N" mortar consisting of:

1. One part Portland Cement to

2. Two part fine sand, by volume.

3. Six parts sand measured damp and loose.

4. Do not use admixtures unless specifically approved in advance and by governmental agencies having jurisdiction.

5. Mix in a mechanically operated mortar mixer for at least three minutes after all ingredients are thoroughly mixed to make thoroughly uniform.

6. On mortar boards, re-temper only by adding water within the batch formed with mortar, and by working the mortar into the water.

B. Grout: Do not use mortar which is used after 1 1/2 hours following the initial mixing.

1. Where compressive strengths exceeding 2000 psi are called for on the Drawings or required by governmental agencies having jurisdiction, provide a laboratory designed mix to the approval.

2. Where compressive strengths are not specified, use a laboratory designed mix to the approval.

**PART 3 - EXECUTION**

**3.1 SURFACE CONDITIONS**

A. Prepare and condition surfaces and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until conditions are corrected.

B. Foundations:

1. Do not commence installation until foundations are clean, rough, and level.

2. Verify that the bed joint thickness will be between 1/2 inch (12.7 mm) and 3/4 inch (19.0 mm).

3. Verify that the foundation elevation is true to the bed joint thickness will be between 1/2 inch (12.7 mm) and 3/4 inch (19.0 mm).

4. Clean projecting dowels free from loose scale, dirt, concrete, and other material that will inhibit bond.

5. Verify that dowels are in proper location.

**3.2 INSTALLATION**

A. Wetting of masonry units.

B. Mortar: Apply mortar sufficiently damp so that mortar will remain plastic enough to permit the masonry unit to be leveled and plumbed immediately after being laid without disturbing the bond.

1. Unless otherwise indicated on the Drawings, make the masonry work plumb, level, and true to the masonry work.

2. Use line blocks wherever possible. When it is absolutely necessary to use a level, pin the level to the masonry work.

3. Use only masonry units that are clean and free from dust and other foreign matter.

4. Do not use bonding headers on grouted masonry unless specifically so directed.

5. Do not use bonding headers on grouted masonry unless specifically so directed.

6. Bad joints:

a. Break all bad joints, sloping toward the center of the wall in such a manner that the bed joints will be filled when the masonry units are finally brought to line.

b. Do not force the bed joints.

c. Avoid fins of bed joints protruding into grout space.

d. Remove caulks or other materials from the bed joint thickness.

e. Do not, in any case, cut off and drop into the grout space.

7. Head joints: Regardless of stone, completely fill with mortar or grout.

8. When masonry units are being moved or shifted, remove and lay again in fresh mortar.

9. Except at the finishing course, stop grout.

10. Test: Testing Agency Qualifications: An independent testing agency, acceptable to authorities having jurisdiction, qualified according to ASTM E 329 to conduct the testing indicated, as follows:

a. Cleaning: Clean and prepare steel surfaces that are to remain unpainted according to SSPC-SP-11, "Solvent Cleaning."

b. Painting: Prepare steel for surface coating after work to structural steel and for passage of other work through steel framing members.

c. Protect slits, ledges, offsets, door jams, corners, and similar points from damage and for each case, provide:

1. Immediately remove mortar and grout from areas where they are not scheduled to be steel surfaces.

2. Base-Patch Holes: Cut, drill, mechanically thermal cut, or punch holes perpendicular to steel surfaces.

**2.5 SHOP CONNECTIONS**

A. Weld Connections: Comply with AWS D1.1 for welding procedure specifications, tolerances, appearance, and quality of welds and for methods used in architectural exposed steel.

B. Assemble and weld both ends of members to be welded, and in alignment with the alignment of axes without exceeding tolerances of AISC's "Code of Standard Practice for Steel Buildings and Bridges" for mill material.

C. Verify that weld sizes, fabrication sequence, and equipment used for architecturally exposed structural steel will limit distortions to allowable tolerances.

D. Grind or fill exposed flat welds to smooth profile. Dress exposed welds.

**PART 3 - EXECUTION**

**3.1 EXAMINATION**

A. Verify elevations of concrete bearing surfaces and locations of anchor rods, bearing plates, and other embedments, and for methods used in architectural exposed steel.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

**3.2 PREPARATION**

A. Provide temporary shores, guys, braces, and other supports during erection to keep structural steel secure, plumb, and in alignment against temporary construction loads and loads equal in intensity to design loads. Remove temporary supports when permanent structural steel connections or bracing are in place, unless otherwise indicated.

**3.3 ERECTION**

A. Set structural steel including in locations and to elevations indicated and according to AISC's "Code of Standard Practice for Steel Buildings and Bridges" and "Specification for Structural Steel Buildings--Allowable Stress Design and Plastic Design."

B. Base Plates: Clean concrete-bearing surfaces of bond-breaking materials, and roughen surfaces prior to setting base plates.

1. Set base plates for structural members on setting nuts as required.

2. Clean concrete-bearing surfaces of bond-breaking materials, and roughen surfaces prior to setting base plates.

3. Snug-tighten anchor rods after supported members have been positioned and plumbed prior to setting base plates.

4. Promptly pack grout solidly between bearing surfaces and base plates so voids remain. Nestly finish exposed surfaces; protect grout and allow to cure. Comply with manufacturer's written installation instructions for shrinkage-resistant grout.

C. Maintain erection tolerances of structural steel and architectural exposed structural steel within AISC's "Code of Standard Practice for Steel Buildings and Bridges."

D. Align and adjust various members forming part of complete frame or structure before permanently fastening. Before assembly, clean bearing surfaces and other surfaces that will be in permanent contact with members. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.

E. Make allowances for difference between temperature at time of erection and mean temperature when structure is completed and in service.

F. Splice members only where indicated.

G. Remove erection bolts on welded, architecturally exposed structural steel; fill holes with plug welds; and grind smooth all exposed surfaces.

H. Do not use thermal cutting during erection.

I. Do not enlarge until holes in members by burning or using drift pins. Ream holes with the following:

1. Product Data: Manufactured masonry and application materials including mortar color charts, and weather resistant barrier.

2. Samples: Panel containing full-size samples of specified manufactured masonry may conduct tests to determine adequacy of concrete by cured cylinders complying with ASTM C 42/C 42M or by other methods as directed by Architect.

3. Units shall have a minimum compressive strength (m') of 3000 psi at 28 days.

4. Masonry and mortar shall have an integral waterproofing agent as determined by the manufacturer.

**SECTION 05310 - STEEL DECK**

**PART 1 - GENERAL**

**1.1 RELATED DOCUMENTS**

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

**1.2 SUMMARY**

A. Section Includes the following:

1. Roof deck.

B. Related Sections include the following:

1. Division 9 Section "Painting" for repair painting of painted deck.

2. Division 9 Section "Special Coatings" for repair of deck special coatings.

**1.3 QUALITY ASSURANCE**

A. Installer Qualifications: An experienced installer who has completed steel deck similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction that meets or exceeds the performance requirements.

B. Testing Agency Qualifications: An independent testing agency, acceptable to authorities having jurisdiction, qualified according to ASTM E 329 to conduct the testing indicated, as follows:

1. Cleaning: Clean and prepare steel surfaces that are to remain unpainted according to SSPC-SP-11, "Solvent Cleaning."

2. Painting: Prepare steel for surface coating after work to structural steel and for passage of other work through steel framing members.

3. Protect slits, ledges, offsets, door jams, corners, and similar points from damage and for each case, provide:

1. Immediately remove mortar and grout from areas where they are not scheduled to be steel surfaces.

2. Base-Patch Holes: Cut, drill, mechanically thermal cut, or